American Fern Journal 77(2):66–72 (1987)

Shorter Notes

Chromosome Numbers of Some Ferns from Argentina.—This contribution is a part of fern projects in progress, namely the systematic revision of the Argentine Thelypteridaceae (by M. Ponce) and a study of the *Microgramma squamulosa* group in the Neotropics (by E. de la Sota and L. Cassá de Pazos).

Material of *Thelypteris* was fixed in situ; *Microgramma* was fixed from plants from Tucumán under cultivation. All material was fixed in Newcomer fluid modified by Hunziker (Kurtziana 3:151–156, 1966). Traditional cytological procedures were utilized for *Thelypteris*. Root tips of *Microgramma squamulosa* were pretreated with 0.002 M 8-hydroxyquinoline for about 3 hours at room temperature. Both types of material, somatic and gametic, were stained with Feulgen and hematoxylin. Photomicrographs were taken with a Zeiss microscope and a Zeiss-Ikon camera. Voucher specimens are deposited in LP and SI.

Results can be summarized as follows:

Microgramma squamulosa (Kaulf.) Sota (Fig. 1,A–D). $2n = 74$, root tips; $2n = 37$ II, meiosis regular. Argentina, Tucumán, Ciudad de Tucumán, Jardín Fundación Miguel Lillo, *Legname* s.n. (LP); under cultivation in Villa Lugano, ciudad de Buenos Aires.

Thelypteris (§*Amauropelta*) *stierii* (Rosenstock) Reed (Fig. 1F) $2n = 29$ II, meiosis regular. Argentina, Salta, Depto. Anta, Parque Nacional "El Rey," picada al Chorro de los Loros, Río La Sala, *Ezcurra et al. 425* (SI).

Thelypteris (§*Goniopteris*) *abbiattii* Reed (Fig. 1E). $2n = 36$ II, meiosis regular. Argentina, Buenos Aires, Isla Martín García, Barrio Chino, *Tur et al. 1825* (LP, SI).

At present, chromosome numbers of nine species of *Microgramma* are known. Most are based on $x = 37$, but Smith and Foster (Fern Gaz. 12:321–329, 1984) and Evans (Caryologia 16:671–677. 1963), reported $n = 36$ for *Microgramma vacciniifolia* (Langsd. & Fisch.) Copel., while Sota and Cassá de Pazos (Bol. Soc. Argent. Bot. 19:69–73, 1980) gave $n = 37$ for the same species. The gametic and somatic numbers reported here for *M. squamulosa* and before for *M. vacciniifolia* support the hypothesis that these taxa are the parents of *M. mortoniana* Sota, as was previously presumed (de la Sota, Amer. Fern J. 63:61–64, 1973).

Additional counts on *Microgramma vacciniifolia* are desirable. That taxon and *M. squamulosa* appear to be part of a complex. Attention should also be paid to the seasonality of spore production. This might help explain strong meiotic abnormalities noticed by Smith and Foster (*l.c.*) for *Microgramma lindbergii* (Mett. ex Kuhn) Sota and *M. vacciniifolia*. Thus, autumnal spores of *M. mortoniana* showed a low germinative power and a high content of oily components (de la Sota & Cassá de Pazos, *l.c.*).

This contribution was partially supported by Consejo Nacional de Investigaciones Científicas y Técnicas, Buenos Aires, Argentina (CONICET), grant no. 17745A/84. Results were given during the Session of Cytology of the XX Jornadas

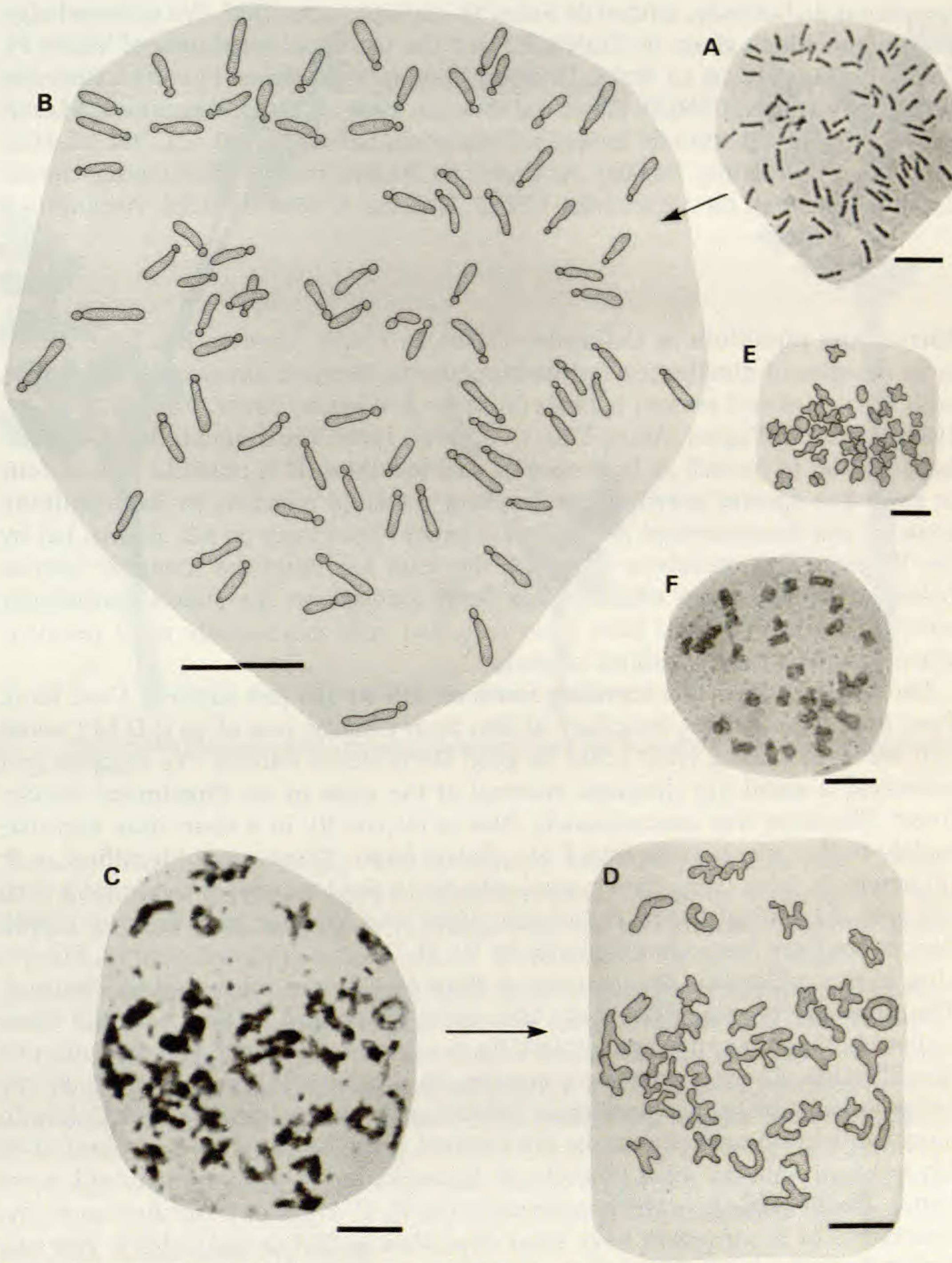

FIG. 1. Chromosomes of Argentine ferns. A, root tip mitosis in *Microgramma squamulosa*, showing 74 somatic chromosomes; B, drawing of the same configuration; C, meiosis in *M. squamulosa*, showing 37 bivalents; D, drawing of the same configuration; E, drawing of metaphase I in *Thelypteris abbiattii*, showing 36 bivalents; F, metaphase I in *Thelypteris stierii*, showing 29 bivalents. Bar scales = 10 μm.

Argentinas de Botánica, ciudad de Salta, 16–20 September 1985. We acknowledge the economic help given by CONICET and the technical assistance of Víctor H. Calvetti.—ELÍAS R. DE LA SOTA, División Plantas Vasculares, Facultad Ciencias Naturales y Museo, UNLP, Paseo del Bosque, 1900 La Plata, Argentina; MARTA MÓNICA PONCE, Instituto de Botánica Darwinion, Labardén 200, C.C. no. 22, 1642 San Isidro, Argentina; LILIANA A. CASSÁ DE PAZOS, Instituto Fitotécnico Santa Catalina, Facultad de Agronomía, UNLP, C.C. no. 4, 1836 Lavallol, Argentina.

***Botrychium pinnatum* in Colorado.**—Western North America has been found to be a center of distribution for the moonworts, *Botrychium* subg. *Botrychium*, with 13 species and several hybrids (Wagner & Wagner, Amer. Fern J. 73:53–62, 1983; Wagner & Wagner, Amer. Fern J. 76:33–47, 1986). The mountains of Colorado have proven to be rich in both species and localities. It is possible to find four or even five species growing together in a roadside meadow in the subalpine zone, as was demonstrated in the 1984 Annual Fern Foray on Mt. Evans, led by the Wagners and ourselves. Although the state has been the scene of intense botanical activity, most attention has been focused on the state's spectacular alpine flora. Botrychiums have been collected only incidentally until recently, when they became the subject of study.

On 30 July 1986, while traveling north on US Rt 550 just south of Coal Bank Pass, near the southern boundary of San Juan County, one of us (J.D.M.) noted that we were passing what could be good *Botrychium* habitat. We stopped and examined a small dry drainage channel at the edge of an Engelmann spruce forest. Elevation was approximately 3045 m (10,000 ft). In a short time approximately twelve plants were found of a *Botrychium*. These were identified as *B. pinnatum* St. John, using the keys in Lellinger (*A field manual of the ferns & fern allies of the United States & Canada*, 1985) and Wagner and Wagner (1986). Specimens have been identified also by W. H. Wagner Jr. (pers. comm.). Silhouettes of this collection, *Montgomery & Root 86-279*, are illustrated in Figure 1. The similarity in vegetative blade and pinna shape and margin with the illustrations in Wagner and Wagner (1983, fig. 1, e–g) is striking and also confirms our identification. These plants were growing in a relatively dense growth of low herbs in contrast to the more open habitat such as roadsides where Colorado moonworts are usually found. In drier gravel near the roadside one plant of *B. lanceolatum* and two of a possible *B. lanceolatum* × *pinnatum* hybrid were found. The possible hybrids have been sent to W. H. Wagner Jr. for further study. Specimens of *B. pinnatum* have been deposited at COLO and MICH. The collection has also been reported to the Colorado Natural Areas Program and is being considered for listing under plants of special concern for the state.

Weber (*Rocky Mountain flora*, 1976) listed *B. boreale* Milde, a Eurasian species formerly confused with *B. pinnatum* (Wagner & Wagner, 1983) as occurring in Colorado. This record is apparently based on a specimen (*Willard & Porsild 6062*, COLO) from Rocky Mountain National Park in Larimer County. Recent examination of this specimen has shown that it is probably *B. hesperium* (Maxon &